AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (original) A measurement method for a bead cutting shape of an electric resistance welded pipe, for measuring the shape following cutting a bead generated on the inner face or outer face of an electric resistance welded pipe at a welding portion, said method comprising:

a step for obtaining an optical cutting image, by taking an image of slit light irradiated on said bead portion with image-taking means, from an angle different to the irradiation direction of said slit light;

a step for obtaining each of

maximum luminance in the pipe axial direction at a given width-direction coordinate on said optical cutting image, and

maximum luminance in background texture region outside of the irradiation range of said slit light;

a step for performing interior division of the maximum luminance of said pipe axial direction and the maximum luminance of said background texture region by a ratio determined beforehand, and setting the obtained luminance as a threshold value;

a step for taking a luminance greater than said threshold value and a weighted mean of pipe axial direction coordinates indicating said luminance as pseudo-cross-sectional direction coordinates for said width-direction coordinates and pipe axial direction coordinates; and

a step for calculating the bead cutting shape of said electric resistance welded pipe based on

a pseudo-cross-sectional shape obtained by stringing pseudo-cross-sectional direction coordinates in the width direction, and

a predetermined conversion expression determined from a geometric positional relation of

said light source of said slit light,

said image-taking means, and

said electric resistance welded pipe.

2. (original) A measurement method for a bead cutting shape of an electric resistance welded pipe, for measuring the shape following cutting a bead generated on the inner face or outer face of an electric resistance welded pipe at a welding portion, said method comprising:

a step for obtaining an optical cutting image, by taking an image of slit light irradiated on said bead portion with image-taking means, from an angle different to the irradiation direction of said slit light;

a step for taking, in the event that the maximum luminance in the pipe axial direction at a given width-direction coordinate on said optical cutting image is equal to or exceeds a predetermined fixed threshold value, a weighted mean of pipe axial direction coordinates indicating said luminance as pseudo-cross-sectional direction coordinates for said width-direction coordinate and pipe axial direction coordinate;

a step for obtaining, in the event that the maximum luminance is less than the predetermined fixed threshold value, each of

maximum luminance in the pipe axial direction at a given width-direction coordinate on said optical cutting image, and

maximum luminance in background texture region outside of the irradiation range of said slit light;

a step for performing interior division of the maximum luminance of said pipe axial direction and the maximum luminance of said background texture region by a ratio determined beforehand, and setting the obtained luminance as a threshold value;

a step for taking a luminance greater than said threshold value and a weighted mean of pipe axial direction coordinates indicating said luminance as pseudo-cross-sectional direction coordinates for said width-direction coordinates and pipe axial direction coordinates; and

a step for calculating the bead cutting shape of said electric resistance welded pipe based on

a pseudo-cross-sectional shape obtained by stringing pseudo-cross-sectional direction coordinates in the width direction, and

a predetermined conversion expression determined from a geometric positional relation of

said light source of said slit light,

said image-taking means, and

said electric resistance welded pipe.

3. (original) A measurement device for a bead cutting shape of electric resistance welded pipe, said device comprising:

a slit light source for irradiating slit light at a given incident angle on a bead portion of an electric resistance welded pipe following cutting;

image-taking means for taking an irradiation image of said slit light at a different receiving angle;

a first computation circuit for calculating, with regard to the optical cutting image output from said image-taking means,

the maximum luminance in the pipe axial direction at a given width-direction coordinate on said optical cutting image, and

the pipe axial direction coordinate where said maximum luminance occurs;

a second computation circuit for calculating the maximum luminance in background texture region, at a position removed by

a predetermined number of pixels or more from a pipe axial direction coordinate where said maximum luminance in said pipe axial direction occurs at a given width-direction coordinate;

an accumulation circuit for calculating

a luminance which is greater than a threshold calculated following a predetermined computation expression from said first computation circuit and said second output computation circuit, and

the weighted mean of pipe axial direction coordinates indicating said luminance;

an image reconfiguring circuit for stinging the weighted mean of pipe axial direction coordinates thus calculated to generate a pseudo-cross-sectional shape in the width direction; and

a coordinates computation circuit for calculating and displaying the bead cutting shape of said electric resistance welded pipe based on a predetermined conversion expression determined from a geometric positional relation of

said slit light source,

said image-taking means, and

said electric resistance welded pipe.

4. (original) A measurement device for a bead cutting shape of an electric resistance welded pipe, said device comprising:

a slit light source for irradiating slit light at a given incident angle on a bead portion of an electric resistance welded pipe following cutting;

image-taking means for taking an irradiation image of said slit light at a different receiving angle;

a first computation circuit for calculating, with regard to the optical cutting image output from said image-taking means,

the maximum luminance in the pipe axial direction at a given width-direction coordinate on said optical cutting image, and

the pipe axial direction coordinate where said maximum luminance occurs;

a branch circuit for judging whether or not the maximum luminance in the pipe axial direction at said certain width direction is equal to or greater than a predetermined fixed threshold value;

a second computation circuit for calculating the maximum luminance in background texture region, at a position removed by a predetermined number of pixels or more from a pipe axial direction coordinate where said maximum luminance in said pipe axial direction occurs at a given width-direction coordinate;

a first accumulation circuit for calculating the weighted mean of pipe axial direction coordinates greater than a threshold obtained by interior division of

the maximum luminance in the pipe axial direction at said certain width direction, and

the maximum luminance at background texture region,

by a predetermined ratio;

a second accumulation circuit for calculating said luminance equal to or greater than said predetermined fixed threshold value and the weighted mean of pipe axial direction coordinates indicating said luminance;

an image reconfiguring circuit for selecting the output of said first accumulation circuit and said second accumulation circuit thus calculated following output from said branch circuit and stringing said output in the width direction so as to generate a pseudo-cross-sectional shape; and

a coordinates computation circuit for calculating and displaying the bead cutting shape of said electric resistance welded pipe based on a predetermined conversion expression determined from a geometric positional relation of

said slit light source,

said image-taking means, and

said electric resistance welded pipe.

5-10. (canceled)

11. (original) An electric resistance welded pipe bead shape detecting method, for detecting the bead shape of an electric resistance welded pipe by the optical cutting method, wherein an image, obtained by a slit light being irradiated or a

point light being scanned on a welding portion of an electric resistance welded pipe and an image of the slit light irradiated on the surface of the welding portion or an image of the track of the point light scanned thereupon being taken with image-taking means from an angle different to the irradiation direction of said slit light, subjected to predetermined image processing; said method comprising:

a step for calculating coordinates for a temporary bead apex by a predetermined calculation expression from a profile of an electric resistance welded pipe;

a step for obtaining a first approximation curve by approximating said profile of said electric resistance welded pipe with a quadratic function;

a step for calculating the coordinates for two intersecting points on either side of said temporary bead apex from said profile of said electric resistance welded pipe and said first approximation curve;

a step for calculating a temporary existence range of the bead by a predetermined calculation expression from

the coordinates of said temporary bead apex, and

the coordinates of two intersection points on either side of said temporary bead apex;

a step for obtaining a second approximation curve by approximating a base pipe shape excluding the temporary existence range of said bead from said profile of said electric resistance

welded pipe with an polynomial expression of a degree which is even and quadratic or higher; and

a step for determining, of regions wherein the deviation between said profile of said electric resistance welded pipe and said second approximation curve is greater than a predetermined threshold value, a region containing the coordinates of said temporary bead apex as being the bead.

12. (original) An electric resistance welded pipe bead shape detecting device, comprising:

light projecting means for irradiating a slit light or scanning a point light on a welding portion of an electric resistance welded pipe at a given angle;

image-taking means for taking an image of said projected light irradiated on the welding portion by said light projecting means, from an angle different to said given angle;

profile calculating means for calculating a profile of said electric resistance welded pipe by subjecting the image obtained from said image-taking means to predetermined image processing;

temporary bead apex detecting means for calculating coordinates for a temporary bead apex by a predetermined calculation expression from the profile of said electric resistance welded pipe;

first regression computation means for approximating with a predetermined regression expression, with said profile of said electric resistance welded pipe as a quadratic function;

intersecting point calculating means for calculating the coordinates for two intersecting points on either side of said temporary bead apex from the output of said first regression computation means and the output of said profile calculating means;

first range calculating means for calculating a temporary existence range of the bead by a predetermined calculation expression from the coordinates of said intersection points and the coordinates of said temporary bead apex;

second regression computation means for approximating said profile of said electric resistance welded pipe excluding the temporary existence range of the bead thus calculated, with an polynomial expression of a degree which is even and quadratic or higher; and

second range calculating means for outputting, of regions wherein the deviation between output from said second regression computation means is greater than a predetermined threshold value and said profile of said electric resistance welded pipe, a region containing the coordinates of said temporary bead apex as being the bead range.

13-23. (canceled)